REMARKS/ARGUMENTS

Claims 1, 2, 5-8, and 11-17 and new claims 18-23 are under consideration, with claims 3, 4, 9, and 10 being withdrawn from consideration.

The Amendments to the Claims

Claim 1 has been amended at line 2 to specify that the blasting network is in a blasting system which further includes a control unit and a communication link for transmitting messages between the control unit and the assembly of detonators. The amended claim is supported at page 2, lines 4-17 of the specification as filed. Claim 1 further clarifies that the messages transmitted between the control unit and the assembly of detonators consist of safe and unsafe messages. This amendment is supported at a number of locations in the specification as filed, including at page 2, lines 26-27 and page 2 line 33 through page 3 line 1. In claim 1, the term "any message which has not been designated as unsafe" has been replaced with "the safe messages" for improved clarity. This replacement is supported at page 6, lines 17-18. The term "any previously designated unsafe message" has also been replaced with"the designated at least one unsafe message" for improved clarity. Claim 1 has also been amended at line 9 (of marked-up version) to clarify that in the control mode the designated at least one unsafe message is prevented from reaching the assembly of detonators. This amendment is supported at page 2, lines 28-31 of the specification as filed. Claim 1 has been further amended for consistency with the above amendments.

Claim 6 has been amended at line 2 to specify that the blasting network is in a blasting system which further includes a control unit and a communication link for transmitting messages between the control unit and the assembly of detonators. The amended claim is supported at page 2, lines 4-17 of the specification as filed. Claim 6 further clarifies that the messages transmitted between the control unit and the assembly of detonators consist of safe and unsafe messages. This amendment is supported at a number of locations in the specification as filed, including at page 2, lines 26-27 and page 2 line 33 through page 3 line 1. In claim 6, the term "any message

which has not been designated as unsafe" has been replaced with "the safe messages" for improved clarity. This replacement is supported at page 6, lines 17-18. The term "any previously designated unsafe message" has also been replaced with "the designated unsafe messages" for improved clarity. Claim 6 has also been amended at line 9 to clarify that in the control mode the designated unsafe messages are prevented from reaching the assembly of detonators. This amendment is supported at page 2, lines 28-31 of the specification as filed. Claim 6 has been further amended for consistency with the above amendments.

Claim 7 has been amended to specify that the system includes a communication link for transmitting messages between the control unit and the assembly of detonators. The amended claim is supported at page 2, lines 4-17 of the specification as filed. Claim 7 further clarifies that the messages transmitted between the control unit and the assembly of detonators consist of safe and at least one designated unsafe message. This amendment is supported at a number of locations in the specification as filed, including at page 2, lines 26-27 and page 2 line 33 through page 3 line 1. In claim 7, the term "any message which has not been designated as unsafe" has been replaced with "the safe messages" for improved clarity. This replacement is supported at page 6, lines 17-18. The terms "any detected unsafe message" and "any previously designated unsafe message" have also been replaced with "the at least one designated unsafe message" for improved clarity. Claim 7 has also been amended at line 8 to clarify that in the control mode the at least one designated unsafe message is prevented from reaching the assembly of detonators. This amendment is supported at page 2, lines 28-31 of the specification as filed. Claim 7 has been further amended for consistency with the above amendments.

Claim 8 has been amended for consistency with amended claim 7, from which it depends.

Claim 9 has been amended to replace "or each" with "at least one designated" for consistency with amended claim 7.

Claim 10 has been amended to replace "any scrambled unsafe message" with "the scrambled at least one designated unsafe message" and to replace "the unscrambled unsafe message" with "the unscrambled at least one designated unsafe message" for consistency with claim 9.

Claim 13 has been amended to depend from new claim 20 and claim 17 has been amended to depend from new claim 22.

New claim 18 relates to a method for controlling a blasting network and is similar to amended claim 1 but contains the limitation that a locking device is used to place the communication link in its control mode or operational mode. This limitation is supported at page 4, lines 23-24 of the specification as filed. New claim 19 relates to a method for controlling a blasting network and is similar to amended claim 1 but contains the limitation that the control unit is connected to an Internet or Intranet facility or connection arrangement. This limitation is supported by Figure 1 and at page 4, lines 11-12 of the specification as filed.

New claim 20 relates to a system for controlling a blasting network and is similar to amended claim 7 but contains the limitation that a locking device is used to place the communication link in its control mode or operational mode. This limitation is supported at page 4, lines 23-24 of the specification as filed. New claim 21 relates to a system for controlling a blasting network and is similar to amended claim 7 but contains the limitation that the control unit is connected to an Internet or Intranet facility or connection arrangement. This limitation is supported by Figure 1 and at page 4, lines 11-12 of the specification as filed.

New claim 22 relates to a blasting system including a system for controlling a blasting network according to claim 20. New claim 23 relates to a blasting system including a system for controlling a blasting network according to claim 21.

It is believed that no new matter has been added by any amendment to the claims.

THE REJECTIONS

The 35 U.S.C. 102(b) Rejections

Claims 1-2, 7-8 and 11/7, 11/8, 12/7, 12/8, 13/7, 13/8, 14/7, 14/8, and 15-17 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,404,820 to Hendrix. Applicants respectfully traverse the rejection. The Office Action of April 29, 2004 states:

> In regards to claim 1, Hendrix discloses a method of controlling a blasting network (10) which includes an assembly of detonators, the method including the steps of designating at least one unsafe message, placing a communication link between a control unit (16) and the network in a control mode in which the communication link is monitored for the unsafe message, in said control mode preventing the unsafe message, when detected, from reaching the blasting network, and placing the communication link in an operational mode in which any previously designated unsafe message is allowed to reach the blasting network, and wherein in both the control mode and the operational mode any message which has not been designated as unsafe is permitted to be transmitted via the communication link, in figures 1, 4, and 5, in column 3, lines 22-28, column 4, lines 19-22 and lines 46-68, column 5 lines 1-12, lines 28-33, lines 45-55, and lines 66-68, and column 6, lines 1-5 and lines 38-41.
>
> In regards to claim 2, Hendrix discloses a method wherein the control mode of the communication link the or each unsafe message is prevented from reaching the assembly of detonators by preventing the onward transmission of the unsafe message in column 4, lines 46-52.
>
> In regards to claim 7, Hendrix clearly discloses a system for controlling a blasting network (10) which includes an assembly of detonators-at (12),(15), the system including a control unit (16) and a communication link for the network, the communication link being capable of being placed in a control mode and in a operational mode, and a monitoring device (6) for monitoring the communication mode for at least one previously designated unsafe message, wherein the communication link in its control mode prevents any detected unsafe message from being transmitted to the blasting network and in its operational mode permits any previously designated unsafe message to be transmitted to the assembly of detonators, and wherein in both its control mode and its operational mode

the communication link permits any message which has not been designated as unsafe to be transmitted via the communication link, in figures 1, 4, and 5, in column 3, lines 22-28, column 4, lines 19-22 and lines 46-68, column 5 lines 1-12, lines 28-33, lines 45-55, and lines 66-68, and column 6 lines 1-5 and lines 38-41.

In regards to claim 8, see rejection for corresponding parts of claim 2, above.

In regards to claims 11/7 and 11/8, Hendrix discloses wherein the control unit is capable of generating legal unsafe messages, which are transmitted via the communication link in its operational mode, in column 4, lines 46-52.

In regards to claims 12/7 and 12/8, Hendrix discloses wherein the monitoring device is a filter, in column 3, lines 30-38 and column 4, lines 41-45.

In regards to claims 13/7 and 13/8, Hendrix discloses wherein the communication link is placed in its control and operational modes by means of a switch (32), in column 4 lines 46-52.

In regards to claims 14/7 and 14/8, Hendrix discloses a blasting system including a control system connected to a blasting network (10) including an assembly of detonators (12), (15), in figure 1, column 4 lines 63-68, column 5 lines 1-12, lines 28-33, lines 45-55, lines 66-68, and column 6 lines 1-5.

In regards to claim 15, Hendrix discloses a blasting system including a control system connected to a blasting network (10) wherein the control unit (16) of the control system for controlling the blasting network is capable of generating legal unsafe messages, which are transmitted via the communication link in its operational mode, in figure 1, column 4 lines 46-52, lines 63-68, column 5 lines 1-12, lines 28-33, lines 45-55, lines 66-68, and column 6 lines 1-5.

In regards to claim 16, Hendrix discloses blasting system including a control system for controlling a blasting network, connected to the blasting network (10) wherein the monitoring device (6) of the control system is a filter, in figure 1, column 3 lines 30-38, column 4 lines 41-45, lines 63-68, column 5 lines 1-12, lines 28-33, lines 45-55, lines 66-68, and column 6, lines 1-5.

In regards to claim 17, Hendrix discloses blasting system including a control system for controlling a blasting network, connected to a blasting network (10) wherein the communication link of the control system is

> placed in its control and operation modes by means of a switch (32) in figure 1, column 4 lines 46-52, lines 63-68, column 5 lines 1-12, lines 28-33, lines 45-55k lines 66-68, and column 6 lines 1-5.

Further, in the Advisory Action of October 8, 2004, the Examiner states that:

> The Hendrix reference discloses both a testing signal (safe message) and a firing signal (unsafe message). As seen in applicant's claim 1 it is stated that "any" unsafe message is allowed to reach the detonators. The term "any" is deemed to mean any number including zero and therefore the Hendrix reference does not need to disclose unsafe messages reaching the detonators. Further in regards to applicant's other arguments regarding the prior art rejections refer back to the response to arguments section (paragraph 5) of the final rejection dated 4-29-04.

In the Advisory Action, the Examiner has suggested the previous claim language referring to "any" unsafe message can be interpreted such that "any" is deemed to mean any number including zero. Applicants respectfully submit that in the present invention neither safe messages nor unsafe messages are intended to be non-messages, and have amended the claims to clarify this point.

Amended claim 1 relates to a method for controlling a blasting network in a blasting system which further includes a communication link for transmitting safe and unsafe messages between the control unit and the assembly of detonators. Amended claim 7 relates to a system for controlling a blasting network which includes a communication link for transmitting safe and unsafe messages between the control unit and the assembly of detonators. In the present invention, if a message has not been designated as unsafe it is considered to be safe. Arm and fire commands are examples of unsafe messages (see page 2, lines 25-26 of the specification as filed). Normal commands to query the blasting network and to determine the status of components at the blasting site are examples of safe messages (see page 8, lines 19-20 of the specification as filed). In the present invention, the communication link is capable of being placed in either a control mode or an operational mode.

Amended claim 1 requires that in the control mode the designated at least one unsafe message is prevented from reaching the assembly of detonators and that in the operational mode the designated at least one unsafe message is allowed to reach the assembly of detonators. Furthermore, in both the control mode and the operational mode the safe messages are permitted to be transmitted to the assembly of detonators via the communication link . Therefore, in the operational mode both the designated at least one unsafe message and the safe messages are permitted to be transmitted to the assembly of detonators.

The Hendrix reference does not contain all the limitations of amended claim 1. In particular, when Hendrix's device is in the armed (operational) state in which the laser pulse (an unsafe message) can be transmitted to the pyrotechnic devices or device windows, Hendrix's device cannot transmit a Built-In-Test command (a safe message, as acknowledged by the Examiner in the Advisory Action) to the pyrotechnic devices or device windows. Therefore, Hendrix fails to teach or suggest the limitation of claim 1 that in both the control mode and the operational mode the safe messages are permitted to be transmitted to the assembly of detonators. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of amended claim 1 and of claim 2, which depends from and incorporates all the limitations of claim 1.

Amended claim 7 requires that the communication link in its control mode prevents the at least one designated unsafe message from being transmitted to the assembly of detonators and in its operational mode permits the at least one designated unsafe message to be transmitted to the assembly of detonators. Amended claim 7 further requires that in both its control mode and its operational mode the communication link permits the safe messages to be transmitted to the assembly of detonators via the communication link . Therefore, in the operational mode both the at least one designated unsafe message and the safe messages are permitted to be transmitted to the assembly of detonators.

The Hendrix reference does not contain all the limitations of amended claim 7. In particular, when Hendrix's device is in the armed (operational) state in which the laser pulse (an unsafe message) can be transmitted to the pyrotechnic devices or device windows, Hendrix's device cannot transmit a Built-In-Test command (a safe message) to the pyrotechnic devices or device windows. Therefore, Hendrix fails to teach the limitation of claim 7 that in both the control mode and the operational mode the safe messages are permitted to be transmitted to the assembly of detonators. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of amended claim 7, and of claims 8 and 11-17, which depend from and incorporate all the limitations of claim 7.

Further discussion of the Hendrix reference is given below.

Hendrix discloses a laser-initiated ordnance controller (LIOC) in which a laser beam is used for explosive ignition. During operation, the LIOC receives command signals from a control panel or remote computer of a flight system that provides Built-in-Test (BIT), Arm, and Fire commands (col. 2, lines 12-15). Hendrix's pyrotechnic ordnance firing system has two light sources (2 and 11 in Figure 1), a high power laser (2) (col. 3, line 29) and a relatively low power (1mW) BIT LED (11) (col. 6, lines 17).

In the safe condition of Hendrix's system, energy from the BIT diode emitter (11 in Figure 1, 38 in Figure 4) is usually directed through a polarization switch (3 in Figure 1, 32 in Figure 4) and an acousto-optic (AO) deflector (6 in Figure 1, 34 in Figure 4) to BIT diode detector (7 in Figure 1, 39 in Figure 4). In this mode, both the polarization switch and the AO deflector are in the off condition (col. 4, lines 55-60). However, as described in column 6, lines 2-25, the energy from the BIT diode emitter can be directed by the AO deflector into the multiple fiber optic channels (10) to test them. This allows testing of the optical path from the BIT diode to each pyrotechnic device (12). The optical path from the BIT light source to each pyrotechnic device can be checked by sending a short pulse of BIT light through the AO deflector into the fiber optic distribution system. Optical energy is reflected from the pyrotechnic device window, specially coated to reflect the BIT wavelength (col. 6, lines 2-25). The energy from the

laser (2 in Figure 1, 30 in Figure 4) may also be tested in the safe condition of the system, with the laser energy being directed by the safe and arm device into a photodetector (col. 4, lines 52-55, col. 6, lines 44-50).

When it is desired to fire Hendrix's ordnance system, the polarization switch is adjusted to permit the energy from the laser (2 or 30) to pass and prevent the energy from the BIT diode from passing and the AO deflector is also adjusted by the system electronics to deflect the energy from the laser into the fiber optic channels (col. 4 line 63 through col. 5 line 12).

In the Examiner's discussion of Hendrix, Hendrix's multiple fiber optic channels (10) (col. 3, lines 28-29) have been equated to the blasting network of the present invention and Hendrix's pyrotechnic devices (12) and pyrotechnic device windows (15) to the detonators of the present invention. The present invention relates to either transmission or prevention of transmission of the unsafe messages and transmission of the safe messages to the assembly of detonators. Therefore, the Hendrix commands relevant for comparison with the present invention's transmission of messages to the assembly of detonators are those which can result in the transmission of a signal to the Hendrix's pyrotechnic devices or pyrotechnic device windows. The two Hendrix commands which can result in transmission of a signal to the Hendrix's pyrotechnic devices or pyrotechnic device windows are the BIT (built-in-test) and Fire commands, both of which can result in transmission of light to the pyrotechnic devices or device windows. As previously discussed, the polarization switch allows the BIT command to result in a signal at the pyrotechnic devices or pyrotechnic device windows only when the system is in the safe state. Further, Hendrix's fire command can result in a signal at the pyrotechnic devices or pyrotechnic device windows only when the system is in the armed state (not de-energized or safed). For the purposes of comparison, Hendrix's armed state can be compared to the operational state of the present invention, since these states allow transmission of unsafe Fire messages to either Hendrix's pyrotechnic devices or device windows or the present invention's assembly of detonators, respectively.

In summary, when Hendrix's device is in the armed (operational) state in which the laser pulse (an unsafe message) can be transmitted to the pyrotechnic devices or device windows, Hendrix's device cannot transmit a Built-In-Test command (a safe message) to the pyrotechnic devices or device windows. Therefore, Hendrix fails to teach the limitation of claims 1 and 7 that in both the control mode and the operational mode the safe messages are permitted to be transmitted to the assembly of detonators.

The 35 U.S.C. 103 Rejections

Claims 5/1, 5/2 and 6 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hendrix in view of U.S. Patent 5,756,924 to Early. The office action states:

> Regarding claims 5/1 and 5/2, Hendrix discloses the claimed invention, except for illustrating that the method of designating an unsafe message include two unsafe messages. Early teaches in figure 4, column 3 lines 55-60, column 7 lines 49-54 and lines 58-76 and column 8 lines 1-4 and lines 46-52, that a first laser (34) is used to provide a high power peak short duration pulse and that a second laser (36) is used to provide a low peak power long duration pulse, which are combined in order to regulate the rate and duration of laser energy delivery. It would have been obvious to one of ordinary skill in the m at the time the invention was made to employ Early's method of combining the energy of two lasers in order to achieve the desired effect of an optimal ignition performance.
>
> In regards to claim 6, Hendrix discloses a method of controlling a blasting network (10) which includes an assembly of detonators, the method including the steps of designating an unsafe message, placing a communication link between a control unit (16) and the network in a control mode in which the communication link is monitored for the unsafe message, in said control mode preventing the unsafe messages, when detected, from reaching the assembly of detonators and placing the communication link in an operational mode in which any previously designated unsafe message is allowed to reach the assembly of detonators, and wherein in both the control mode and the operational mode any message which ahs not been designated as unsafe is permitted to be transmitted to the assembly of detonators via the communication link and wherein the designated unsafe message is respectively equated with arm and fire commands, in figures 1, 4 and 4, in column 3 lines 22-28, column 4 lines 19-22, and lines 46-68, column 5 lines 1-12, lines 28-33, lines 45-55, and lines 66-68, and column 6 lines 1-5 and lines 38-41.

> Hendrix discloses the claimed invention, except for illustrating that the method of designating an unsafe message includes two unsafe messages. Early teaches in figure 4, column 3, lines 55-60, column 7 lines 49-54 and lines 58-67, and column 8 lines 1-4 and lines 46-52, that a first laser (34) is used to provide a high power peak short duration pulse and that a second laser (36) is used to provide a low peak power long duration pulse, which are combined in order to regulate the rate and duration of laser energy delivery. It would have been obvious to one of ordinary skill in the m at the time the invention was made to employ Early's method of combining the energy of two lasers in order to achieve the desired effect of an optimal ignition performance.

Early relates to a multiple laser pulse ignition method and apparatus. Early teaches contacting of a fuel with a short duration laser pulse to form a plasma and to initiate fuel combustion followed by contacting said plasma with a long duration laser pulse, thereby stabilizing and sustaining said fuel combustion (col. 2, line 64 through col. 3, line 3). Early further teaches that use of two or more laser light pulses with certain differing temporal lengths and pulse powers can be employed in sequence to regulate the rate and duration of laser energy delivery to fuel mixtures, thereby improving fuel ignition performance over a wide range of fuel parameters (col. 3, lines 56-61). However, Early fails to teach transmission of safe messages to the fuel mixtures and an operational mode in which both the safe and the unsafe messages are transmitted to the fuel mixtures.

Claim 5 includes all the limitations of amended claim 1. The Hendrix and Early references, both singly and in combination, fail to teach or suggest all the limitations of claim 1. In particular, the combination of references fails to teach or suggest that in both the control mode and the operational mode the safe messages are permitted to be transmitted to the assembly of detonators. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 5.

Amended claim 6 requires that in control mode the designated unsafe messages are prevented from reaching the assembly of detonators and that in operational mode the designated unsafe messages are allowed to reach the assembly of detonators. Furthermore, in both control mode and operational mode the safe messages are

permitted to be transmitted to the assembly of detonators via the communication link. Therefore, in the operational mode both the designated unsafe messages and the safe messages are permitted to be transmitted to the assembly of detonators.

The Hendrix and Early references, both singly and in combination, fail to teach or suggest all the limitations of claim 6. In particular, the combination of references fails to teach or suggest that in both the control mode and the operational mode the safe messages are permitted to be transmitted to the assembly of detonators. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 6.

The Withdrawn Claims

It is believed that the rejections of generic claim 1 have been overcome. Therefore, applicants respectfully request rejoinder of claims 3, 4, 9 and 10, which were withdrawn from consideration.

The New Claims

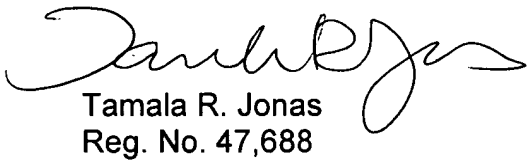
New claims 18, 20, and 22 contain the limitation that a locking device is used to place the communication link in control mode or in operational mode. New claims 19, 21 and 23 contain the limitation that the control unit is connected to an Internet or Intranet facility or connection arrangement. Neither the Hendrix reference nor the Early reference teaches or suggests these claim limitations. Furthermore, new claims 18 and 19 contain the limitations of amended claim 1, which is patentable over the Hendrix and Early references. New claims 20 and 21 contain the limitations of claim 7, which is patentable over the Hendrix and Early references. Therefore, Applicants submit that claims 18-23 are patentable over the cited Hendrix and Early references.

CONCLUSION

This application being in condition for allowance passage to issuance is respectfully requested.

It is believed that a fee of $824, for the addition of 4 independent claims ($264) and an additional one month extension of time ($560) is due with this submission. Applicants note that a fee of $420 for a two-month extension of time was submitted on September 29, 2004. Checks for $264 and $560 are enclosed with this submission, in addition to a check for $790 in payment of the fee for the accompanying Request for Continuing Examination. If this amount is incorrect, please credit any overpayment or deduct any required fee, including any fee due for extension of time, from deposit account 07-1969.

Respectfully submitted,



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